



In re Application of:

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Serial No.: 10/055,172

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For: THERMOPLASTIC COMPOSITIONS HAVING
HIGH DIMENSIONAL STABILITY

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Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

I, Hasmukh Patel, hereby state and declare as follows.

1. I am the Research and Development Engineering Supervisor for Associated Packaging Enterprises, Inc., the owner of the entire interest in the above-captioned application. I have been employed by Associated Packaging for approximately two years.
2. Under my direction and in my presence, certain compositions described in EP 0 838 501 A2 ("EP '501") were prepared and tested at the University of Toledo Polymer Institute in order to evaluate molded dimensional stability. Additional testing of the molded samples was conducted under my direction and in my presence at the Cambridge, Ontario facilities of Associated Packaging in order to evaluate heat shrinkage and high temperature stability (heat distortion).
3. Two compositions were prepared essentially as set forth in the last two entries of Table 2 (page 8) of EP '501. Two additional compositions were prepared based on the last two entries of Table 2 of EP '501, except that no fiberglass reinforcing agent was used. The four compositions prepared are identified in Table I below as A through D.

Table I

Component	A (wt %)	B (wt%)	C (wt %)	D (wt%)
Eastman Eastapak 9921 – PET (IV = 0.80) (Lot # 2141225, 2753050)	65	80	65	80
Atofina LOTADER AX8900 – Terpolymer (Lot # B205R018)	6	6	4	4
Atofina LOTRYL 29MA03 – Copolymer (Lot # B205R040)	14	14	16	16
Owens Corning CRATEC – 183F –14P Fiber Glass	15	0	15	0

4. A dry blend (5 kg) of each of the four compositions A-D was compounded using a twin-screw extruder. The PET was dried overnight at 275°F and cooled with dehumidified air at 100°F one hour prior to blending. The process parameters used for compounding are shown in Table II below. Zone 1 was set to a lower temperature so that the lower melting material would not stick.

Table II

Barrel	Set Point (°C)
Zone 1	220
Zone 2	270
Zone 3	270
Zone 4	270
Zone 5	270

Melt temperature	271°C
% Torque	35-55%
Screw Speed	300 rpm
Output	10.5 kg/hr (23 lb/hr)
Vacuum	15" Hg
Augur feed rate	1 rev / 9.6 sec
Pelletizer Speed	50 unit

5. Following overnight drying at 195°F or overnight drying in a 30" Hg vacuum oven, each of the four compositions was injection molded into ASTM specimens. The process parameters used for injection molding are shown in Table III below.

Table III

<u>Barrel</u>	<u>Set Point (°C)</u>
Zone 1	280
Zone 2	280
Zone 3	280
Zone 4	280
Zone 5	280
Zone 6 – Nozzle	290

Holding Pressure	1400 Bar
Holding time at pressure	9 sec
Injection Pressure Max Set	1000 Bar
Back Pressure	5 Bar
Cooling water temperature	70°F
Circumferential Screw Speed	22.9 m / min
Cooling Time	22, 80, and 280 sec

6. The specimens were cool to the touch upon ejection (and, of course, were much cooler at the longer cooling times). The specimens were conditioned for 60 hours at 73°F and 50% relative humidity prior to testing. Two photographs showing the four initial specimens (prior to heat treatments), marked as A1-D1, are attached as Tab A.

7. Each of the specimens at each of the cooling times was analyzed for initial crystallinity using DSC. All of the samples analyzed were virtually amorphous.


8. The specimens were tested for heat distortion at 212°F by placing the initial specimens A-D in boiling water for 2 minutes. The compositions not containing the fiberglass reinforcing agent (specimens B and D) visibly distorted, while the compositions containing the fiberglass reinforcing agent (specimens A and C) did not visibly distort under these conditions. A photograph of the four specimens following treatment at 212°F is attached as Tab B.

9. Additional testing for heat shrinkage and heat distortion was conducted at the Cambridge, Ontario facilities of Associated Packaging. For the heat shrinkage test, the initial specimens A-D were placed flat on a tray. A photograph of the initial specimens placed on the tray is attached as Tab C. The tray containing the specimens was placed in a preheated oven (Lunaire Limited – Model # B50C46) at 250°F for five (5) minutes. Following this treatment, all of the samples exhibited shrinkage. Those specimens not containing fiberglass reinforcing agent (specimens B and D) exhibited significantly greater shrinkage compared to the specimens containing fiberglass reinforcing agent (specimens A and C). Two photographs showing the specimens following this treatment are attached as Tab D.

10. To evaluate heat distortion at elevated temperatures, the initial specimens A-D were placed against the side wall of the Lunaire oven. A photograph of the initial specimens A-D positioned against the side wall of the oven is attached as Tab E. In separate experiments, the initial specimens A-D placed against the side wall of the oven were exposed to temperatures of 250°F, 300°F, 350°F, and 400°F for one (1) minute. All of the specimens exhibited distortion from these treatments. Those specimens not containing fiberglass reinforcing agent (specimens B and D) exhibited significantly greater distortion compared to the specimens containing fiberglass reinforcing agent (specimens A and C). Photographs of the specimens following these treatments are attached as Tab F (250°F), Tab G (300°F), Tab H (350°F), and Tab I (400°F).

I hereby acknowledge that all statements made herein of my own knowledge are true and that all statements made herein on information and belief are believed to be true. I acknowledge that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. § 1001), and may jeopardize the validity of the application or any patent issuing thereon.

Date: Nov 18th 2002


Hasmukh Patel